COMPUTER VISION FINAL PROJECT

In this project, we are given a dataset of images that have been extracted from the pokemon go game. The image contains the picture of the pokemon, along with its CP(Combat Power), HP, Stardust and a semicircular arc with a white arc representing the level of the respective pokemon.

We are required to find the ID,CP,HP,Stardust and the level of the pokemon. Also the center of the semicircle where the level is specified has to be plotted.

For this Assignment, I have decided to implement the bag of words model.

In this model we need to train the data to predict the ID,CP,HP,stardust of the image.

For this we need to convert the image from color format to grayscale. Once this is done, we can extract the feature points from the image like Corner points, SURF points,MSER regions etc. I have used SURF features.

After feature points being detected, the feature point descriptors are found by using the extractfeatures function in MATLAB. This gives us the feature descriptors around the feature points. These are 64 dimension vectors. All the descriptors of all the training images are stored in an array.

This is the bag of words. Now we have to cluster all the features to form a codebook. For this I have used the k means clustering. I picked 100 clusters that is all the features are divided into 100 groups each group represented by one feature in the codebook.

Now the feature histogram is generated . Feature histogram is the representation of each image as a bag of words.

Now the model is trained with the feature histogram and the label of the variable to be predicted(now in our case CP,HP,ID,stardust). And this can be used to predict the results on the test dataset.

For finding the center of semi circle, I used a simple mathematical logic. The x coordinate of the center of the semicircle will be the half of width and the y coordinate will be approximately one third of the height(based on the geometry).

For the level of CP I speciefied a crop region and searched for circles of radius range 0 to 0.5, the detected circles centers is returned.

Difficulties:

Time for running the program is really high, approximately 1-2 hours. If using the fitsecoc svm classifier, it is taking a longer time, so had to use knn.

Extracting features for some cp,hp,stardust and level requires a cropped region. So defining a cropped region requires a lot of trial and error